

# University of Toronto

OFFICE OF THE VICE-PRESIDENT, RESEARCH AND ASSOCIATE PROVOST

## ASSIGNMENT OF RIGHTS TO THE UNIVERSITY OF TORONTO BY THE INVENTOR

In consideration of the terms and mutual covenants hereinafter contained and other good and valuable consideration in the sum of Two Dollars (\$2.00) of lawful money of Canada paid by each of the parties to the other, the receipt and sufficiency of which are hereby acknowledged **Daniel Lidar and Lian-Ao Wu**, their heirs, executors, administrators and assigns (collectively the "Assignor") and **The Governing Council of the University of Toronto**, its successors and assigns (collectively the "Assignee") covenant and agree as follows:

### Background:

The Inventions, as defined below, are governed by the terms of the July 19, 2001 Research Agreement, Supplements dated July 27, 2001 and February 24, 2003 and Amendment dated September 23, 2004 (the "Research Agreement") with D-Wave Systems Inc. ("D-Wave") attached hereto as Appendix A.

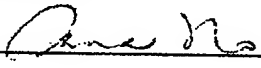
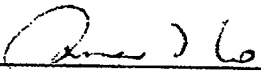
1. As used in this Assignment, "Net Revenues" shall mean payments received by the Assignee under Section 12(d)(i) of the Research Agreement and/or royalty, licensing and other revenue received by the Assignee other than from D-Wave, from all rights held by the Assignee in the invention entitled "**Encoding and Error Suppression for Superconducting Quantum Computers**" ("Invention 1"), "**Methods of Qubit Gate and Teleportation**" ("Invention 2"), and "**Dressed Qubit**" ("Invention 3") (collectively the "Inventions") as described respectively in Appendices B, C and D attached hereto, less legal and other fees that the Assignee incurs directly in the process of establishing and maintaining the legal protection of those rights.
2. The Assignor hereby assigns to the Assignee all right, title and interest, whatever the same may be (but without any representation or warranty as to the nature, extent or validity thereof) which the Assignor now has or may in the future have in the Invention including without limitation the right to apply for patents in Canada, the United States of America and any other country, the right to receive any letters patent that may be issued from any such applications and the right to sell, license or assign the Invention or the rights thereto.
3. Nothing herein shall alter the Assignor's rights to share options granted to them under the Research Agreement.
4. In consideration of the rights granted the Assignee pursuant to this Assignment, the Assignor hereby acknowledges the receipt and sufficiency of due consideration received through the Research Agreement in the form of certain options to purchase shares in D-Wave. Additionally, the Assignee agrees to pay the Assignor 25% of Net Revenues.

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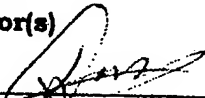
5. Any money to be paid by the Assignee pursuant to this Assignment shall be paid to the Assignor annually on or before the thirtieth day following the anniversary of the execution of this Assignment accompanied by a statement of the Net Revenues received by the Assignee during the previous twelve months.
6. The Assignor agrees to make full and complete disclosure of the Invention to the Assignee, and shall make available to the Assignee any physical embodiments of the Inventions and other data that will be or that may be useful to the Assignee in exercising its rights in the Invention.
7. The Assignor agrees to execute, acknowledge and deliver all such further assurances and to do all such acts as may be necessary to carry out the intent and purpose of this Agreement, including without limitation, to execute powers of attorney and other documents required to maintain intellectual property protection of the Invention, and to review and provide comments with respect to such intellectual property protection when requested by the Assignee.
8. The Assignee agrees to indemnify and save the Assignor harmless from and against any loss arising out of or pursuant to any claims or demands in connection with the Invention and all costs, damages and expenses (including reasonable legal fees) incurred by the Assignor in connection therewith, except to the extent caused by the Assignor's breach of any of the Assignor's obligations herein or of any representations or warranties given by the Assignor in the Disclosure.
9. Save and except for the right to enforce the terms contained in this Assignment, the Assignor releases the Assignee from any and all claims that the Assignor may now have or may in future have in respect of the Invention.

This Agreement is made effective the 17<sup>th</sup> November, 2003.

**Witness**


  


**Inventor(s)**


  
 Daniel Lidar

  
 Lian-Ao Wu

**The Governing Council of the  
University of Toronto**

  
 John R.G. Challis, F.R.S.C.

Vice-President, Research and Associate Provost

 /s  
 Louis R. Charpentier  
 Secretary

**APPENDIX A**

**RESEARCH AGREEMENT**

**BETWEEN**

**D-WAVE SYSTEMS INC.**

**AND**

**THE GOVERNING COUNCIL OF THE UNIVERSITY OF TORONTO**

AMENDING AGREEMENT between  
D-Wave Systems and the Governing Council of The University of Toronto

This AMENDING AGREEMENT made in duplicate the 23 day of ~~July~~ September, 2004.  
BETWEEN:

**D-WAVE SYSTEMS INC.**  
(the "Company")

— and —

**THE GOVERNING COUNCIL OF THE UNIVERSITY OF TORONTO**  
(the "University")

WHEREAS the Company and the University entered into an agreement effective July 19, 2001, (the "Research Agreement") for the performance of a research project entitled "Quantum encoding and error correction" (the "Project");

AND WHEREAS the parties now wish to amend the Research Agreement by reference herein;  
The parties hereby agree as follows:

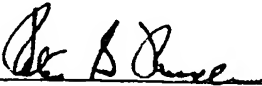
1. Except as otherwise defined herein, any capitalized terms used in this Amending Agreement shall have the meanings prescribed by the Research Agreement.
2. Clause 12(d) in the Research Agreement is replaced by the following:

The total compensation to the University in exchange for the granting of the exclusive licence on the terms set out above is the following: Upon issuance of a patent from the United States Patent office, D-Wave will:

- (i) pay CND \$1,000.00 to the University, by cheque sent to the attention of Peter B. Munsche, Assistant Vice-President, Technology Transfer; and
  - (ii) convey options to purchase 2500 Class A-shares in D-Wave at the price of CND \$3.25 as follows:
    - (A) 1,875 to the University
    - (B) 625 to the University inventors named on the respective issued patents. The inventors shall notify D-Wave in writing, how they wish to share the 625 share options.
3. All other terms of the Research Agreement shall remain unchanged and in full force and effect.

In witness whereof the parties agree to be bound by the terms of this Amending Agreement.

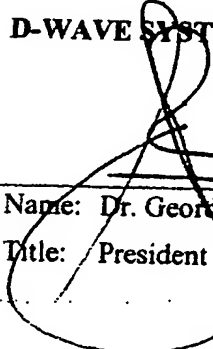
**THE GOVERNING COUNCIL OF THE  
UNIVERSITY OF TORONTO**



Name: Peter Munsche

Title: Assistant Vice-President,  
Technology Transfer

**D-WAVE SYSTEMS INC.**



Name: Dr. Georgie Rose

Title: President & CEO

**RESEARCH AGREEMENT (SUPPLEMENT)**

THIS SUPPLEMENTARY RESEARCH AGREEMENT ("Supplementary Agreement") made as of the 24<sup>th</sup> day of February, 2003.

BETWEEN:

**D-Wave Systems Inc.**  
(hereinafter called "D-Wave")

- and -

**The Governing Council of the University of Toronto**  
(hereinafter called the "University")

- and -

**Professor Daniel Lidar**  
(hereinafter called the "Principal Investigator")

- and -

**Dr. Somshubhro Bandyopadhyay**  
(hereinafter called the "Researcher")

WHEREAS the parties to this Supplementary Agreement have entered into a Research Agreement dated July 23, 2001 (the "Research Agreement") and this Supplementary Agreement is supplementary to the Research Agreement,

AND WHEREAS D-Wave and the Principal Investigator wish to formalize the involvement of the Researcher pursuant to the terms and conditions of the Research Agreement,

IN CONSIDERATION of the premises and the mutual covenants and agreements herein contained, it is agreed by and between the parties as follows:

1. All definitions in the Research Agreement apply herein, and where there is a conflict between this Supplementary Agreement and the Research Agreement, the terms of this Supplementary Agreement shall take precedence.
2. The Researcher agrees to comply with the terms and conditions of the Research Agreement as if the Researcher was a party thereto, and the University agrees to take reasonable steps to ensure the Researcher complies with the terms and conditions of the Research Agreement as if the Researcher was a party thereto.
3. In consideration for the Researcher covenanting with D-Wave as stated at Section 2 above, D-Wave agrees to grant to the Researcher the option to purchase 1000 Class B Common shares in D-Wave with the following terms:
  - (i) a vesting date as of the date of the execution of this Supplementary Agreement;
  - (ii) a purchase price of \$3.25 Canadian per share;
  - (iii) all other terms to be determined by D-Wave's Stock Option Plan, as approved by its directors and amended from time to time.

## RESEARCH AGREEMENT (SUPPLEMENT)

This AGREEMENT made in duplicate the 27 day of July, 2001.

BETWEEN:

**D-Wave Systems Inc.**  
(hereinafter called "D-Wave")

— and —

**The Governing Council of the University of Toronto**  
(hereinafter called the "University")

— and —

**Professor Daniel Lidar**  
(hereinafter called the "Principal Investigator")

WHEREAS the parties to this Agreement have entered into an Agreement dated July 23, 2001 (the "Agreement") and this agreement (the "Supplementary Agreement") is supplementary to the Agreement,

AND WHEREAS D-Wave and the Principal Investigator wish to formalize Lianao Wu ("Wu")'s involvement in the Agreement,

IN CONSIDERATION of the promises and the mutual covenants and agreements herein contained, it is agreed by and between the parties as follows:

1. All definitions in the Agreement apply herein and where there is a conflict between the Supplementary Agreement and the Agreement, the terms of the Agreement shall take precedence.
2. D-Wave agrees to grant to Wu the option to purchase 1000 Class B shares in D-Wave with the following terms:
  - (i) a vesting date as of the date of the execution of this Contract;
  - (ii) a purchase price of \$3.25 Canadian per share;
  - (iii) all other terms to be determined by D-Wave's Stock Option Plan, as approved by its directors and amended from time to time.

**FILE C**

## RESEARCH AGREEMENT

This AGREEMENT made in duplicate the 19<sup>th</sup> day of July, 2001.

BETWEEN:

**D-Wave Systems Inc.**  
(hereinafter called "D-Wave")

and

**The Governing Council of the University of Toronto**  
(hereinafter called the "University")

and

**Professor Daniel Lidar**  
(hereinafter called the "Principal Investigator")

WHEREAS the Principal Investigator and University are prepared to undertake a research project entitled "Quantum Encoding and Error Correction", hereinafter called the "Project";

AND WHEREAS D-Wave wishes to support the Project;

The parties hereby agree as follows:

1. The University shall perform the Project as described in Appendix "A" attached hereto.
2. Work on the Project shall commence on or about May 1<sup>st</sup>, 2001 and shall be completed on or about April 30<sup>th</sup>, 2003.
3. The Principal Investigator shall be responsible for the technical content of the Project, and agrees to be available and to attend meetings with D-Wave when reasonably requested and at D-Wave's expense.
4. In consideration of the University carrying out the Project, D-Wave shall pay the University the sum of \$70,000 per annum for costs of the work, all generally in accordance with the attached budget (Appendix "B").
5. Unless this Agreement is terminated in accordance with paragraph 13, the sum stipulated in Paragraph 4 above shall be paid by D-Wave, by cheque for the full amount, payable to the University of Toronto and addressed to the Assistant Vice-President, Technology Transfer, according to the following schedule:

Invoicing Date	Invoice Total
May 1 <sup>st</sup> , 2001	\$17,500
August 1 <sup>st</sup> , 2001	\$17,500
November 1 <sup>st</sup> , 2001	\$17,500

11. The University may publish or disclose the research results arising from performance of the Project and will acknowledge the support of D-Wave in all such publications. The University will provide a copy of any proposed publication or disclosure to D-Wave for its review at least thirty (30) days before submission for publication or disclosure. Upon the written request of D-Wave received within twenty (20) days of the receipt of such draft by D-Wave, the University will, at D-Wave's option:
- (a) delay publication up to ninety (90) additional days to enable D-Wave to secure intellectual property protection of Intellectual Property that would be publicly disclosed by said publication; and/or
  - (b) delete any Confidential Information provided by D-Wave from the manuscript or proposed disclosure.
12. Ownership of the technical information, know-how, copyrights, models, drawings, specifications, prototypes, inventions and software developed by the Principal Investigator and/or other University personnel in performance of the Project (the "Intellectual Property") shall vest with the University. Ownership of the technical information, know-how, copyrights, models, drawings, specifications, prototypes, inventions and software developed by the Principal Investigator and/or other University personnel in conjunction with employees of D-Wave in performance of the Project (the "Joint Intellectual Property") shall vest jointly with the University and D-wave. D-Wave shall have an option on an exclusive licence to use the Intellectual Property and/or the University's interest in Joint Intellectual Property (the "Option"). The terms of the Option are the following::
- (a) The Option must be exercised by notice in writing from D-Wave to the University within six (6) months of the date of completion of the Project. The University agrees not to license the Intellectual Property to any other party during the option period.
  - (b) To the extent that D-Wave, at its sole discretion, decides that protection of the Intellectual Property and/or Joint Intellectual Property is warranted, D-Wave will bear the costs of protecting the Intellectual Property and/or Joint Intellectual Property.
  - (c) The exclusive licence to D-Wave shall be on the following terms:
    - (i) without limiting the exclusivity of the licence, but for clarification, the licence will preclude the University from exploiting the Intellectual Property for any commercial purpose, and from licensing the Intellectual Property to any other entity. However, the University will retain the right to use the Intellectual Property and/or Joint Intellectual Property for research, teaching and administrative purposes;
    - (ii) D-Wave will have the authority to litigate to enforce all rights relating to the Intellectual Property including but not limited to infringement of any legal protections obtained by D-Wave with respect to the Intellectual




13. D-Wave shall indemnify and save harmless University and its servants and agents against all costs, suits or claims on account of injuries (including death) to persons participating in the Project or damage to property, caused by agents or personnel of D-Wave during the performance of this Agreement or resulting from the use by D-Wave or its affiliates, its customers or licensees of any deliverable or intellectual property developed by University or D-Wave under this Agreement. University shall indemnify and save harmless D-Wave against all costs, suits or claims on account of injuries (including death) to persons participating in the Project or damage to University property, caused by the wilful or negligent act or omission of personnel of University during the performance of this Agreement or resulting from the use by the University or its employees or affiliates, of any deliverable or intellectual property developed by University or D-Wave under this Agreement. Such liabilities and claims shall include, without limiting the generality of the foregoing, federal or provincial taxes, federal or provincial pension plan contributions, unemployment insurance premiums, Workers' Compensation premiums and contributions under any federal or provincial social insurance or income security programs.
14. Either party may terminate this Agreement by giving thirty (30) days written notice to the other of such termination and the University will be entitled to credit for work performed hereunder prior to termination including the University's termination and severance costs, and D-Wave will be entitled to a return of the balance of any advance payment.
15. D-Wave will not use the name of University, nor of any member of University's staff, including that of the Principal Investigator, in any advertising or publicity without the prior written approval of an authorized representative of University. University will not use the name of D-Wave, nor any employee of D-Wave, in any advertising or publicity without the prior written approval of D-Wave. However, both D-Wave and the University may use the following information for public consumption: name of Principal Investigator; Principal Investigator's department; University's name; D-Wave's name; title of the Project; duration of the Project; and, contract value.
16. The University shall not be liable for any delays in the performance of its obligations under this Agreement resulting from circumstances or causes beyond the University's control, and in no case shall the University be liable for loss of business or profit or other indirect or consequential damage.
17. Notices under this Agreement shall be sent to the parties as follows:
  - (a) to the University:
    - i. for technical and scientific matters:

Prof. Daniel Lidar  
Department of Chemistry  
University of Toronto  
80 St. George Street  
Toronto, Ontario


22. This Agreement shall be governed by and construed in accordance with the laws of Canada and the laws of the Province of Ontario applicable therein.
23. This Agreement embodies the entire agreement of the parties hereto and no change or modification shall be valid unless it is in writing and signed by both parties.

In witness whereof the parties agree to be bound by the terms of this Agreement.

**THE GOVERNING COUNCIL OF THE  
UNIVERSITY OF TORONTO**

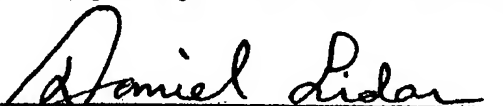
  
Name: Heather Munroe-Blum  
Title: Vice-President, Research and  
International Relations

**D-WAVE SYSTEMS**

  
Name:  
Title: Vice - President, Intellectual Property  
and Legal Affairs

**PRINCIPAL INVESTIGATOR**

I, the Principal Investigator, having read this Agreement, hereby agree to act in accordance with all the terms and conditions herein and further to agree to ensure that all University participants are informed of their obligations under such terms and conditions.

  
Name: Daniel Lidar  
Title: Professor

## APPENDIX "B"

### ANNUAL BUDGET

Payment to Professor Lidar	\$40,000
Postdoctoral Student	\$10,000
University Overhead (40%)	\$20,000
<b>Total:</b>	<b><u>\$70,000</u></b>

Each person working on the project, whether or not paid from Research Agreement funds, must sign and date this agreement. Please return a signed original of this agreement to Devin Kreuger at Research Services, Simcoe Hall, Rm. 133S, who can be reached at 978-6927 for information about the Research Agreement.

20/01/99


## Confidential Information & Intellectual Property Agreement

The University of Toronto (the "University") may make information and facilities for research available to me in connection with my work under a contract between the University and D-Wave Systems (the "Sponsor") for the project entitled "Quantum encoding and error correction" (the "Research Agreement").

In consideration of information and facilities made available to me and other valuable consideration, I agree that:

1. I will keep confidential, in accordance with the terms of the Research Agreement, all of the Sponsor's confidential information that I may receive. I will also keep the terms of the Research Agreement confidential.
2. I will comply with all publication conditions that may be set out in the Research Agreement.
3. I will give complete information to the University's Office of Research Services about any intellectual property, including any invention, improvement, discovery, or software that I may make, conceive, develop, or reduce to practice in performance of the project ("Intellectual Property"), unless Research Services advises me that the information is not required.
4. I will comply with all conditions regarding Intellectual Property that may be set out in the Research Agreement.
5. All decisions about the protection of Intellectual Property under applicable legislation, ownership of and rights in any resulting application or patent, and revenue from Intellectual Property will be made in accordance with the University's *Inventions Policy* and/or *Software Policy* and the Research Agreement, and I will accept such decisions as final.
6. I will sign all documents and do all things necessary or proper to give effect to this Agreement and any rights granted by the University under the Research Agreement.
7. I have had an opportunity to review the applicable terms of the Research Agreement and obtain independent advice on the Research Agreement and my obligations under this Agreement.

By signing below, I indicate my acceptance of these terms.

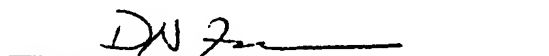
  
Signature

Prof. Daniel Lidar

Name (Type or Print)

Date

11/7/01

  
Witness

DAVID FARRAR

Name (Type or Print)

Date

11/7/01

**APPENDIX B**

**UNIVERSITY OF TORONTO INVENTIONS POLICY  
CONFIDENTIAL INTELLECTUAL PROPERTY DISCLOSURE**

**Encoding and Error Suppression for Superconducting  
Quantum Computers**



# UNIVERSITY OF TORONTO INVENTIONS POLICY CONFIDENTIAL INTELLECTUAL PROPERTY DISCLOSURE

Office of the Vice-President - Research and International Relations

27 King's College Circle, Room 133-S

Tel: (416) 978-7833

Fax: (416) 978-5821

email: monique.mcnaughton@utoronto.ca

1. Title:

Encoding and Error Suppression for Superconducting Quantum Computers

2. a) University of Toronto Inventors/Major Contributors:

SURNAME, GIVEN NAMES	UNIVERSITY PERSONNEL NO.	DEPARTMENT (LIST ANY CROSS APPOINTMENTS OR AFFILIATED INSTITUTIONS)	AFFILIATION WITH UNIVERSITY (i.e. faculty, res. assoc., post-doc, student, staff, visitor, etc.)	CURRENT ADDRESS, PHONE, FAX, EMAIL
Daniel Lidar	1010284	Chemistry	Faculty	Phone: 416-946-7488 Fax: 416-946-7705 dlidar@chem.utoronto.ca
Lian-Ao Wu	1013052	Chemistry	Post-doc	Phone: 416-946-0152 Fax: 416-978-5325 lwu@chem.utoronto.ca

2. b) External Inventors/Major Contributors:

(Please provide names and affiliations of non-University of Toronto individuals who have made a creative contribution to this Intellectual Property, i.e. sponsor employees, academic collaborators, etc.)

Alexandre Blais, University of Sherbrooke

3. Description:

(Please highlight the novelty or patentable aspects of this Intellectual Property; attach a separate sheet if necessary)

See U.S. Patent Application #60/370,087 entitled **Encoding and Error Suppression for Superconducting Quantum Computers**, filed April 4, 2002 by Pennie & Edmonds LLP (docket number 11090-050-888).

DATE RECEIVED:

NOV 17 2003

DISCLOSURE REFERENCE NO.:

10001078

(For Research Services use only)

4. How was the work leading to this Intellectual Property funded? i.e. salaries, equipment used, supplies etc.

SPONSOR	GRANT OR CONTRACT FUND #	INTELLECTUAL PROPERTY TERMS & CONDITIONS
D-Wave Systems Inc.	450682	See Research Agreement

5. Where did the work leading to this Intellectual Property take place?

University of Toronto Department of Chemistry  
University of Sherbrooke

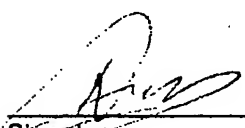
6. Is this Intellectual Property subject to any software licence, material transfer, confidentiality, non-disclosure, collaboration or other agreement, written or oral, not referenced in Section 4?  
  X   NO            YES (If "Yes", please provide details)

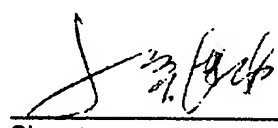
7. What are the potential applications and/or sources of revenue from this Intellectual Property?

This work offers technical simplifications in the design and construction of solid-state quantum computers, in particular those using superconducting Josephson junction qubits, and electrons-spins in quantum dots.

8. Warranty:

I/We, the Inventors/Contributors listed in Section 2(a), have read, understood and agree to all of the preceding and declare that all of the information provided in this disclosure is complete and correct. To the best of our knowledge, all persons who might legally make an ownership claim in this Intellectual Property are identified in Section 2(a) and 2(b).

  
\_\_\_\_\_  
Signature Date 14/11/03  
Typed Name: Daniel Lidar

  
\_\_\_\_\_  
Signature Date 14/11/03  
Typed Name: Lian-Ao Wu

\_\_\_\_\_  
Signature Date  
Typed Name: . . . . .

\_\_\_\_\_  
Signature Date  
Typed Name: . . . . .

For more information on University of Toronto intellectual property policies, please call 416-978-7833 or access <http://www.library.utoronto.ca/techtran/>.  
For information on commercialization processes and procedures please call the Innovations Foundation at 416-978-5117.

**APPENDIX C**

**UNIVERSITY OF TORONTO INVENTIONS POLICY  
CONFIDENTIAL INTELLECTUAL PROPERTY DISCLOSURE**

**Methods of Qubit Gate and Teleportation**





# UNIVERSITY OF TORONTO INVENTIONS POLICY CONFIDENTIAL INTELLECTUAL PROPERTY DISCLOSURE

Office of the Vice-President - Research and International Relations

27 King's College Circle, Room 133-S

Tel: (416) 978-7833

Fax: (416) 978-5821

email: monique.mcnaughton@utoronto.ca

1. Title:

Methods of Qubit Gate and Teleportation

2. a) University of Toronto Inventors/Major Contributors:

SURNAME, GIVEN NAMES	UNIVERSITY PERSONNEL NO.	DEPARTMENT (LIST ANY CROSS APPOINTMENTS OR AFFILIATED INSTITUTIONS)	AFFILIATION WITH UNIVERSITY (i.e. faculty, res. assoc., post-doc, student, staff, visitor, etc.)	CURRENT ADDRESS, PHONE, FAX, EMAIL
Daniel Lidar	1010284	Chemistry	Faculty	Phone: 416-946-7488 Fax: 416-946-7705 dlidar@chem.utoronto.ca
Lian-Ao Wu	1013052	Chemistry	Post-doc	Phone: 416-946-0152 Fax: 416-978-5325 lwu@chem.utoronto.ca

2. b) External Inventors/Major Contributors:

(Please provide names and affiliations of non-University of Toronto individuals who have made a creative contribution to this Intellectual Property, i.e. sponsor employees, academic collaborators, etc.)

Alexandre Blais, University of Sherbrooke

3. Description:

(Please highlight the novelty or patentable aspects of this Intellectual Property; attach a separate sheet if necessary)

See U.S. Patent Application #60/400,844 entitled **Methods of Qubit Gate and Teleportation**, filed August 1, 2002 by Pennie & Edmonds LLP (docket number 11090-013-888).

DATE RECEIVED: **NOV 17 2003**

DISCLOSURE REFERENCE NO.: **RIS 1079**

(For Research Services use only)

4. How was the work leading to this Intellectual Property funded? i.e. salaries, equipment used, supplies etc.

SPONSOR	GRANT OR CONTRACT FUND #	INTELLECTUAL PROPERTY TERMS & CONDITIONS
D-Wave Systems Inc.	450682	See Research Agreement

5. Where did the work leading to this Intellectual Property take place?

University of Toronto Department of Chemistry  
University of Sherbrooke

6. Is this Intellectual Property subject to any software licence, material transfer, confidentiality, non-disclosure, collaboration or other agreement, written or oral, not referenced in Section 4?

X  NO   YES (If "Yes", please provide details)

7. What are the potential applications and/or sources of revenue from this Intellectual Property?

This work offers technical simplifications in the design and construction of solid-state quantum computers, in particular those using superconducting Josephson junction qubits, and electrons-spins in quantum dots.

8. Warranty:

I/We, the Inventors/Contributors listed in Section 2(a), have read, understood and agree to all of the preceding and declare that all of the information provided in this disclosure is complete and correct. To the best of our knowledge, all persons who might legally make an ownership claim in this Intellectual Property are identified in Section 2(a) and 2(b).

Signature

Typed Name: Daniel Lidar

Date

14/11/03

Signature

Typed Name: Lian-Ao Wu

Date

14/11/03

Signature

Typed Name:

Date

Signature

Typed Name:

Date

For more information on University of Toronto Intellectual property policies, please call 416-978-7833 or access <http://www.library.utoronto.ca/techtran/>.

For information on commercialization processes and procedures please call the Innovations Foundation at 416-978-5117.

**APPENDIX D**

**UNIVERSITY OF TORONTO INVENTIONS POLICY  
CONFIDENTIAL INTELLECTUAL PROPERTY DISCLOSURE**

**Dressed Qubit**



# UNIVERSITY OF TORONTO INVENTIONS POLICY CONFIDENTIAL INTELLECTUAL PROPERTY DISCLOSURE

Office of the Vice-President - Research and International Relations

27 King's College Circle, Room 133-S

Tel: (416) 978-7833

Fax: (416) 978-5821

email: monique.mcnaughton@utoronto.ca

1. Title:

Dressed Qubit

2. a) University of Toronto Inventors/Major Contributors:

SURNAME, GIVEN NAMES	UNIVERSITY PERSONNEL NO.	DEPARTMENT (LIST ANY CROSS APPOINTMENTS OR AFFILIATED INSTITUTIONS)	AFFILIATION WITH UNIVERSITY (i.e. faculty, res. assoc., post-doc, student, staff, visitor, etc.)	CURRENT ADDRESS, PHONE, FAX, EMAIL
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2. b) External Inventors/Major Contributors:

(Please provide names and affiliations of non-University of Toronto individuals who have made a creative contribution to this Intellectual Property, i.e. sponsor employees, academic collaborators, etc.)

3. Description:

(Please highlight the novelty or patentable aspects of this Intellectual Property; attach a separate sheet if necessary)

See U.S. Patent Application #60/451,913 entitled **Dressed Qubits**, filed March 3, 2003 by Pennie & Edmonds LLP (docket number 11090-059-888).

DATE RECEIVED: NOV 17 2003

DISCLOSURE REFERENCE NO.: 215 1050

(For Research Services use only)

4. **How was the work leading to this Intellectual Property funded? I.e. salaries, equipment used, supplies etc.**

SPONSOR	GRANT OR CONTRACT FUND #	INTELLECTUAL PROPERTY TERMS & CONDITIONS
D-Wave Systems Inc.	450682	See Research Agreement

- 5. Where did the work leading to this Intellectual Property take place?**

**University of Toronto Department of Chemistry**

6. Is this Intellectual Property subject to any software licence, material transfer, confidentiality, non-disclosure, collaboration or other agreement, written or oral, not referenced in Section 4?


☒ NO ☐ YES (If "Yes", please provide details)

7. **What are the potential applications and/or sources of revenue from this Intellectual Property?**


This work offers technical simplifications in the design and construction of solid-state quantum computers, in particular those using superconducting Josephson junction qubits, and electron-spins in quantum dots.

- 8. Warranty:**

I/We, the Inventors/Contributors listed in Section 2(a), have read, understood and agree to all of the preceding and declare that all of the information provided in this disclosure is complete and correct. To the best of our knowledge, all persons who might legally make an ownership claim in this Intellectual Property are identified in Section 2(a) and 2(b).

Signature:  Date: 14/11/03

Typed Name: Daniel Lidar

Signature  Date 14/11/15

Typed Name: Lian-Ao Wu

Signature \_\_\_\_\_ Date \_\_\_\_\_  
Typed Name: \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_  
Typed Name: \_\_\_\_\_

For more information on University of Toronto intellectual property policies, please call 416-978-7833 or access <http://www.library.utoronto.ca/techtran/>.  
For information on commercialization processes and procedures please call the Innovations Foundation at 416-978-5117.